WHAT IS CLAIMED IS:

1. A sensing device which comprises:

at least one optical fiber supported in a structure;

a movable mass supported within the structure; and

means for detecting changes in tension in said at least one optical fiber due to movement of said movable mass.

2. A sensing device according to claim 1 wherein said detecting means comprises at least one fiber optic Bragg grating written into a core of each of said optical fibers.

3. A sensing device according to claim 2 wherein said sensing device has a plurality of optical fibers and a first fiber optic Bragg grating associated with a first one of said optical fibers has a first reflective wavelength and a second fiber optic Bragg grating associated with a second one of said optical fibers has a second reflective wavelength, which second reflective wavelength is different from said first reflective wavelength.

4. A sensing device according to claim 2 wherein said detecting means comprises a plurality of fiber optic Bragg gratings associated with each of said optical fibers.

5. A sensing device according to claim 4 wherein each of said fiber optic Bragg gratings associated with each of said optical fibers has a different reflective wavelength.

6. A sensing device according to claim 1 wherein said detecting means comprises a fiber optic Bragg grating laser sensor associated with each of said optical fibers.

7. A sensing device according to claim 1 further comprising a plurality of optical fibers supported in said structure and said movable mass being surrounded by said optical fibers and being in contact with said optical fibers.

8. A sensing device according to claim 7 wherein said structure comprises a cage.

9. A sensing device according to claim 8 further comprising a gap between each side of said mass and said cage and said gap being sufficiently small to limit motion of said mass in shock

or high acceleration and to limit the maximum tension seen by each of said optical fibers.

10. A sensing device according to claim 1 wherein said sensing device has a single optical fiber having a serpentine configuration with a plurality of legs and wherein said detecting means comprises a detector in each of said legs.

11. A sensor for detecting roll in a towed array, said sensor comprising:

a plurality of optical fibers supported in a structure;

a movable mass supported within the structure by said optical fibers; and

means for detecting changes in tension in each of said optical fibers due to movement of said movable mass.

12. A sensor according to claim 11 wherein said optical fibers are the only deformable structure within the sensor.

13. A sensor for detecting pitch in a towed array comprising:

a plurality of optical fibers supported in a structure;

a movable mass supported within the structure by said plurality of optical fibers; and

means for detecting changes in tension in each of said optical fibers due to movement of said movable mass.

14. A sensor according to claim 13 wherein said optical fibers are the only deformable structures in said sensor.